RFP in RPM

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Dependent variable is continuous and restricted to the unit interval (0, 1), so use beta regression of the form $\eta = b_0 + b_1 * \text{backbone } (+b_2 * \text{gravity})$, $log(\frac{p}{1-p}) = \eta$.

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Call:
betareg(formula = medians ~ backbone + gravity)

Standardized weighted residuals 2:
    Min      1Q  Median      3Q     Max
-2.2166 -0.7123 -0.0433  0.8769  1.8907

Coefficients (mean model with logit link):
            Estimate Std. Error z value Pr(>|z|)
(Intercept) -0.75893    0.04990 -15.210  < 2e-16 ***
backboneamp  0.46766    0.06188   7.558 4.11e-14 ***
backbonechl  0.38803    0.06209   6.250 4.11e-10 ***
backbonekan  0.38660    0.06209   6.226 4.77e-10 ***
gravity1g   -0.06273    0.04316  -1.454    0.146

Phi coefficients (precision model with identity link):
      Estimate Std. Error z value Pr(>|z|)
(phi)    571.0      201.7   2.831  0.00464 **
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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Type of estimator: ML (maximum likelihood)
Log-likelihood:  39.7 on 6 Df
Pseudo R-squared: 0.8244
Number of iterations: 359 (BFGS) + 3 (Fisher scoring)
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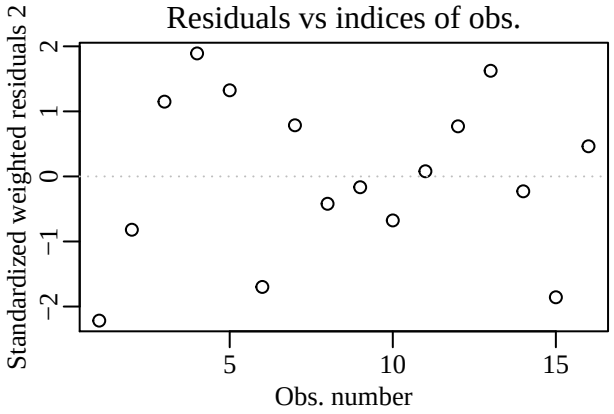

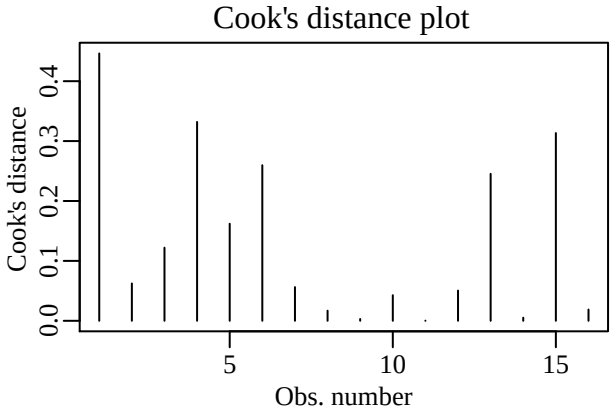

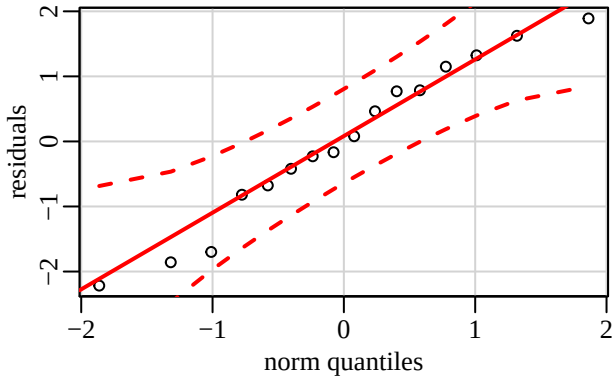

Results

Though heteroscedasticity is difficult to judge from $n = 16$ observations, the residuals look reasonably equally dispersed. Furthermore, we see that none of the observations have a Cook's distance greater than 0.5 (influential) or 1.0 (outlier). Finally, we see that the error of the linear predictor does not deviate significantly from normality. The coefficients are 31.9% relative redness for controls and 42.8%, 40.8%, 40.8% for amp, chl, kan, respectively. All backbones differ significantly from the control $p < 0.001$.